Skills Labs

High-quality e-practicals Water Management with EMERGO

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Centre for Learning Sciences and Technologies
celstec.org

Facts & Figures

- NAP e-learning (goals for HE: higher input, better throughput) [OC&W-Surf]

- Budget total for Skills Labs: 387 k€ (Surf 65%)

- Partners
  - OUNL (CELSTEC) (125 k€)[Rob, Hans, Aad, Hub, Jeroen, Francien, Wim]
  - OUNL (Natural sciences, Business and Administration) (110 k€)
  - Hogeschool Zeeland (75 k€)
  - KNDW (Dutch research institutes focused on Water Management) (62 k€)

- Time frame: September 2008 – March 2010
  - November 08 – July 09:
    - case development (e-case = serious game)
    - professionalisation & support (workshops – demonstrators/templates)
    - 'nulmeting'
    - dissemination: www.skillslabs.org
  - July 09: start evaluation e-cases
  - → September 09 - dissemination

Skills Labs: Case development with EMERGO

Overview:

- Project aims

- e-cases Water Management

- EMERGO methodology

- EMERGO toolkit

- EMERGO architecture

- Demonstrator-template(s)

Skills Labs: project aims

1. Improve study success and quality via e-cases
   - tackling teacher-bandwidth (peers & multi-actor)
   - >> flexibility and reusability (case-library, case-templates)

2. Dissemination
   - within project team
   - at partner level
   - beyond project partners (externally)

Project aim 1: Improve study success and quality

Bottlenecks in training program for Water Management (WM):

- Acquiring complex skills in multi-facet/modal problem contexts demand too intensive learner support formats

- Teacher-bandwidth problem → delay, skill gaps

- Practical & content related constraints (locations, time, # actors)

- Not sustainable

So: suboptimal training

Solution: high-quality and sustainable e-practicals for WM

Improve study success and quality. How?: e-cases WM

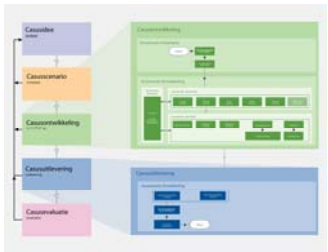
High-quality sustainable e-practicals to remove training bottlenecks
= scenario-based learning

- (1) Consist of authentic tasks, multi-actor, (embedded) support & peer support & autonomy, multimedial sources & immersiveness, and prosumer options

- (2) Developed with EMERGO-methodology & toolkit. Use EMERGO-player

- (3) Satisfy towards flexibility – reusability – maintenance
  - case library : tasks and sources are separated
  - case templates (e.g., market place, PBL, negotiation, truth gathering)

Solution:
EMERGO enables high-quality sustainable e-learning with small exploitation figures (i.e., tackles teacher-bandwidth problem)



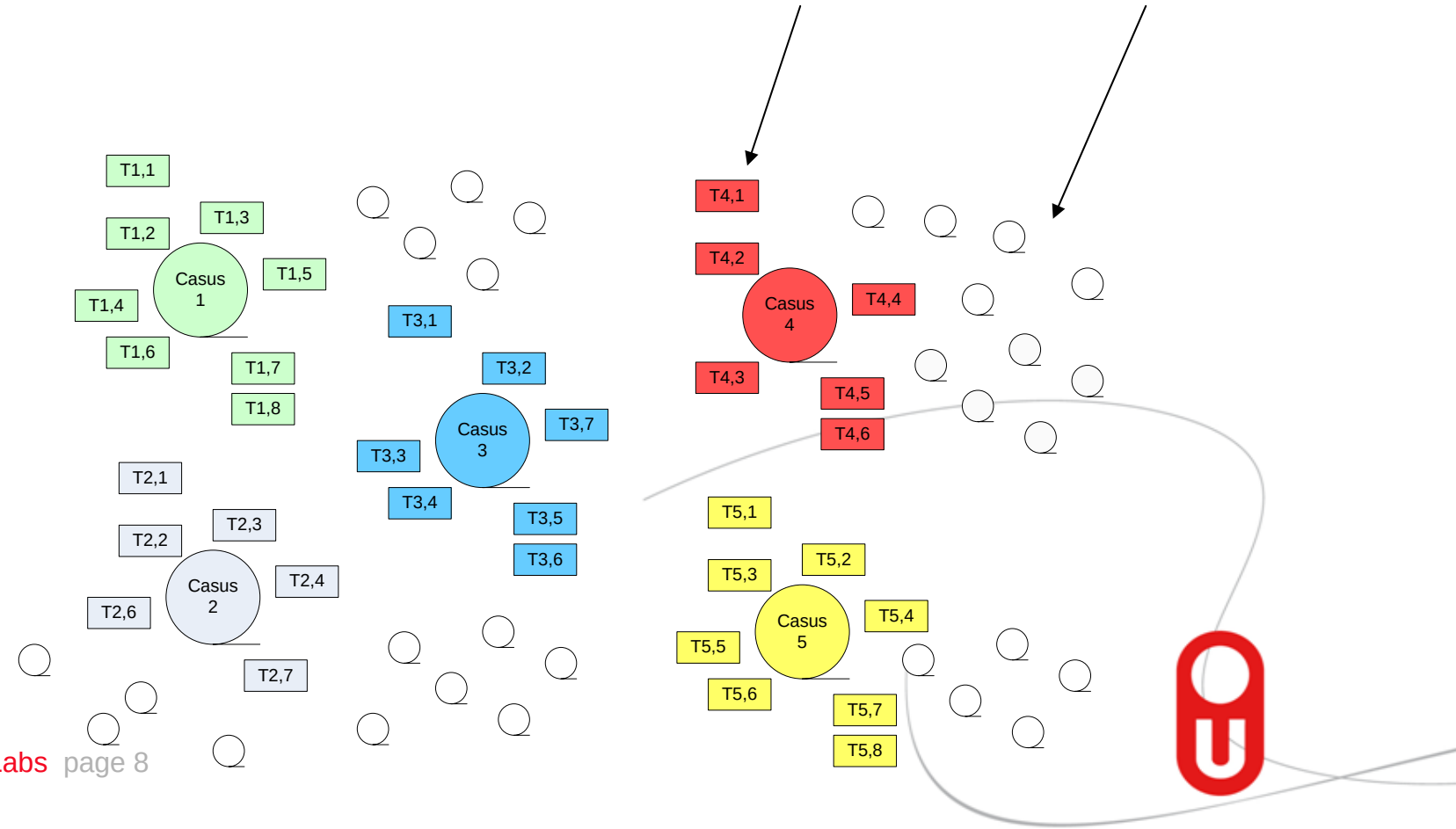
Authentic tasks in e-cases WM

Authentic tasks - characteristics (Herrington, Oliver, Reeves, 2002)

- real-world relevance
- ill-defined (learners define subtasks themselves)
- complex tasks (time consuming)
- different perspectives (variety of resources)
- opportunity to collaborate
- opportunity to reflect
- integrated & different subject areas, beyond domain-specific outcomes
- real-world assessment
- competing solutions, diversity of outcomes
- polished products

flexibility – reusability - maintenance

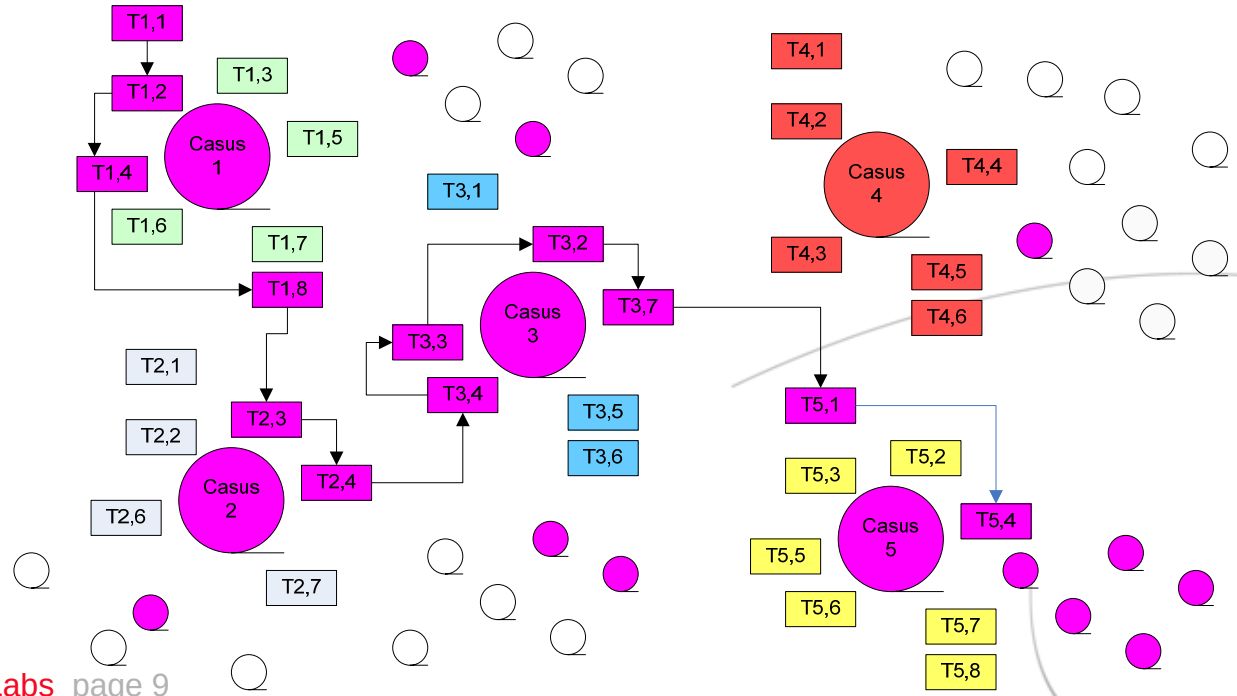
Case library: separation tasks and resources



flexibility – reusability - maintenance

Case library: separation tasks and sources

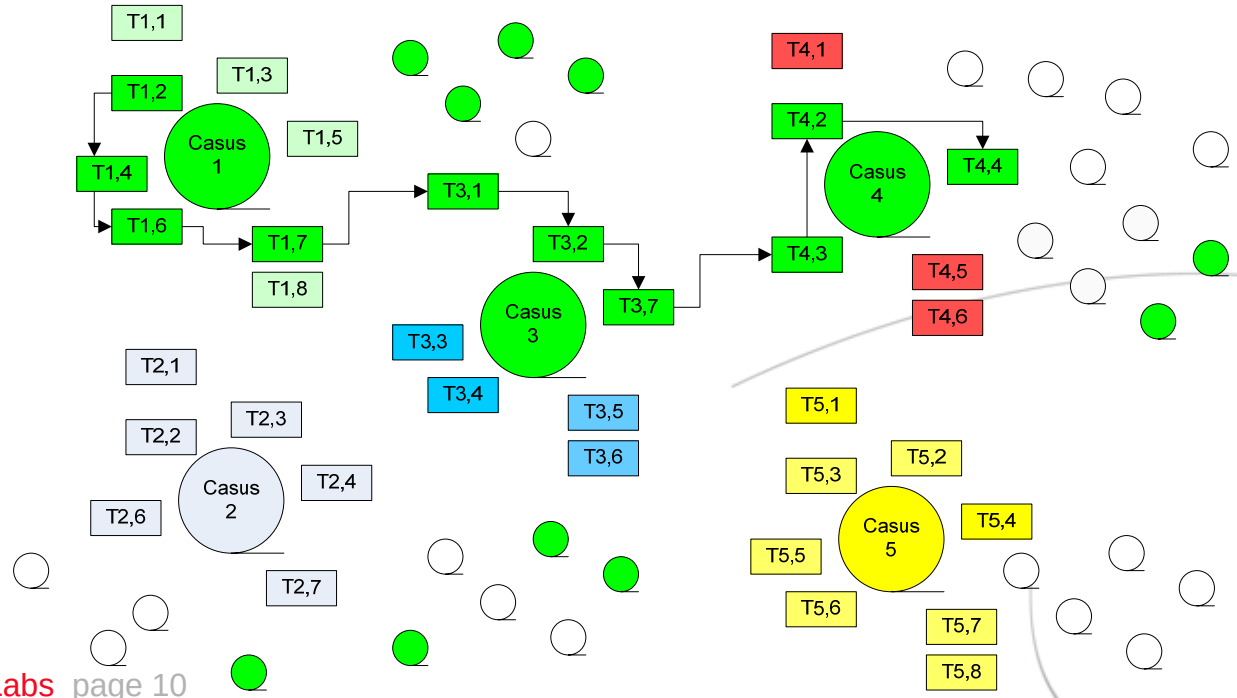
[exploitation partner 1 : structure, subset tasks-sources]



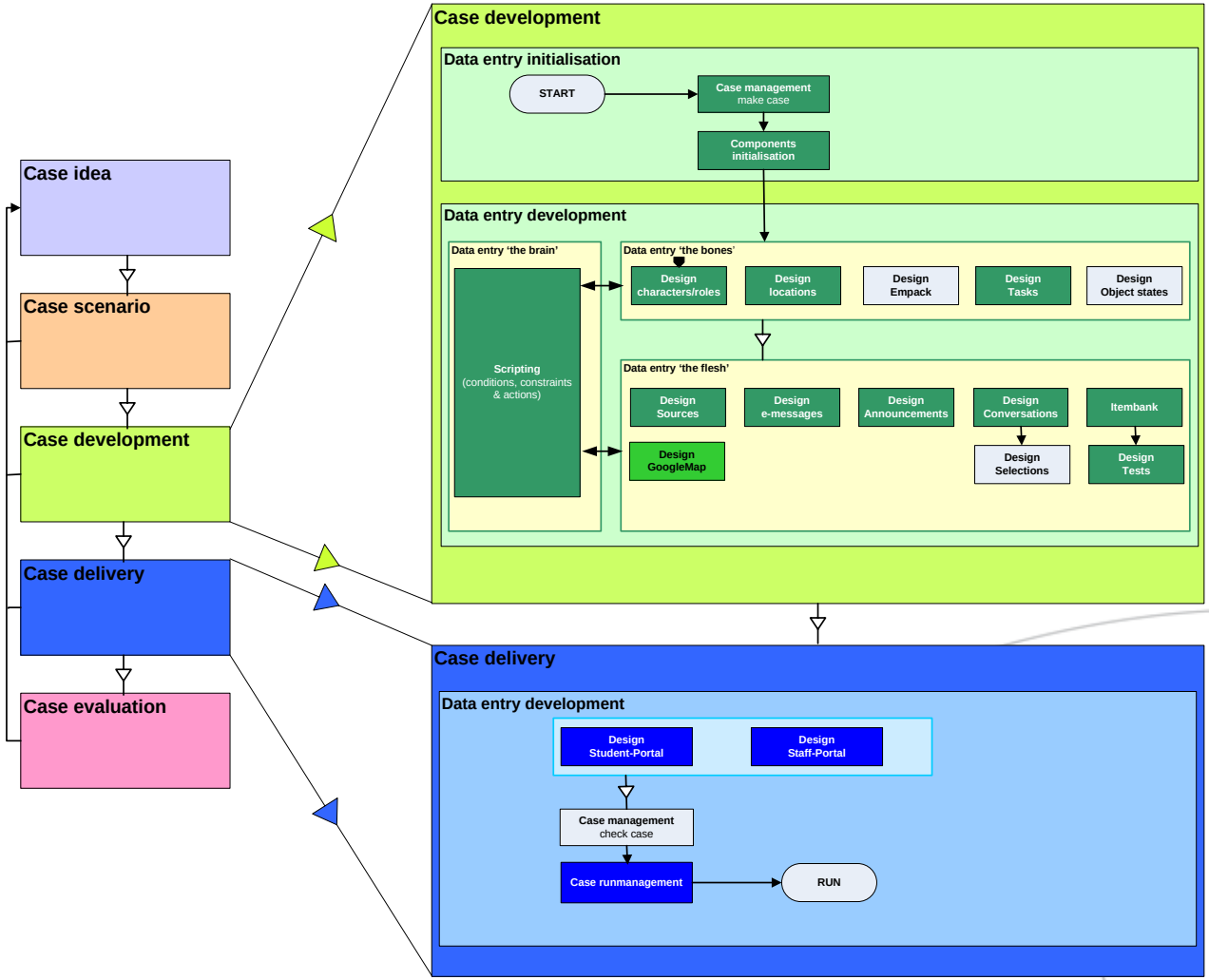
flexibility – reusability - maintenance

Case library: separation tasks and sources

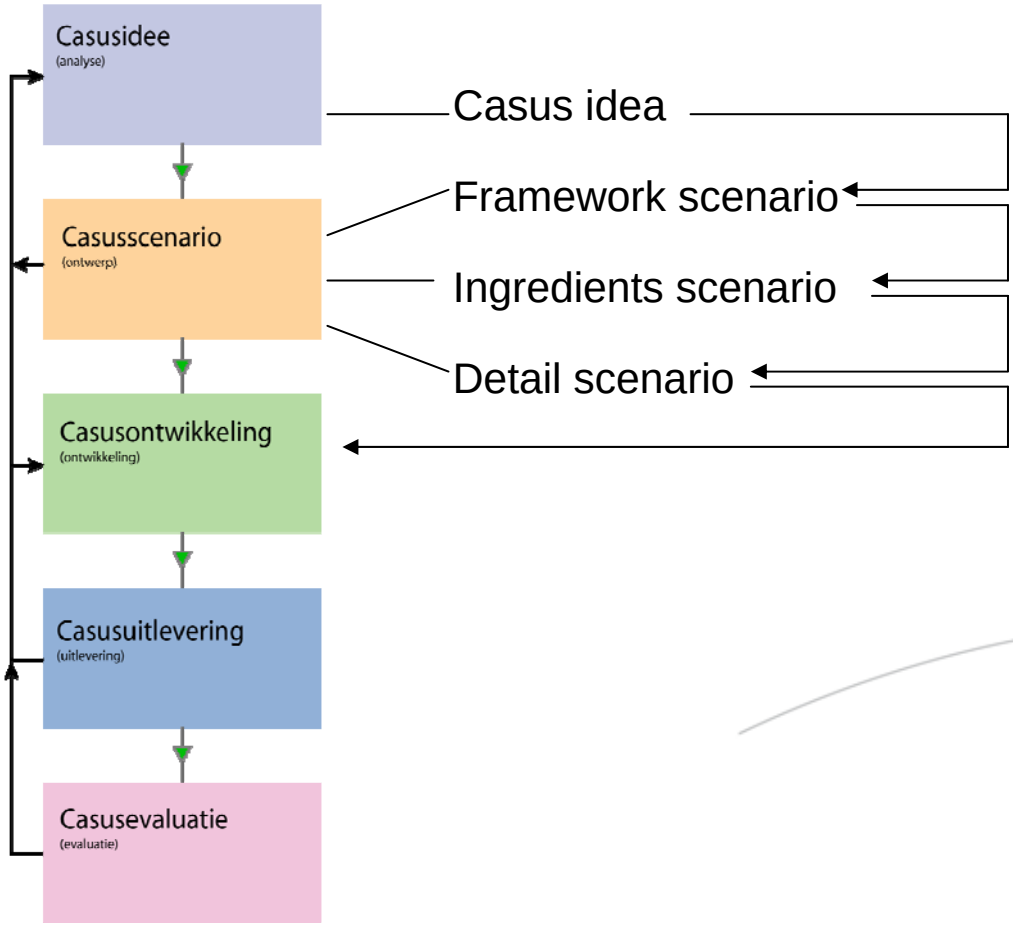
[exploitation partner 2: other structure and subset]



EMERGO methodology & toolkit



EMERGO methodology

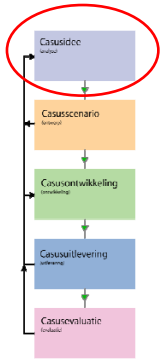


Workshop 1 (± nov 08)

Workshop 2 (± dec)

Workshop 3 (± jan 09)

Workshops 4-7 (from febr)



Case idea

Waddenzee

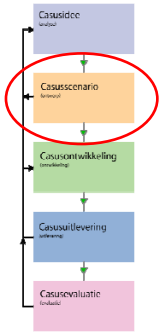
(‘running example’)

	A29: Various design measures will be taken to warrant sufficient interest and motivation, including identification with the student role (junior) and responsibility (helping others, being supported and assessed by coach), gaining knowledge that is highly authentic and implicit, having rich resources available that make the course lively, introducing interactivity and gaming elements (like unexpected, real-life events) that raise the awareness of actually being involved, awareness of presence of other students (overview of their progress and results)
	Q26: What unforeseen circumstances are incorporated? A26: Unforeseen circumstances still have to be worked out but can for instance be that an expert has ran out of time for consultation, that parameters used in a prior report now seem to have become outdated, political change, new report, et cetera
	Q27: Is competition incorporated? How do students get rewarded for excellent performance or behaviour? A27: No, currently it is only envisioned that students can see each others progress. They will not be rewarded or punished for their ranking. The teacher might ask students to compare their report with that from another.
Students' progress	Q28: How do students discover not yet having acquired the main complex cognitive skill? A28: The task list provides an overview of tasks to be carried out for each case, including an estimation of time for each task. So time wise they can monitor amount of study time passed and ahead. To assess progress on each step (usually a collection of some tasks) students will be provided automated feedback (provided by coach, or by partial worked out examples). Each report has to be accepted by the teacher.
	Q29: How can students monitor their progress? A29: Ibid. The task list provides an overview of tasks to be carried out for each case, including an estimation of time for each task. So time wise they can monitor amount of study time passed and ahead. To assess progress on each step (usually a collection of some tasks) students will be provided automated feedback (provided by coach, or by partial worked out examples). Each report has to be accepted by the teacher. Furthermore, they can compare their progress with that of their peers.
	Q30: How is it checked if students have acquired the main complex cognitive skill? A30: Students select appropriate methods and models from a (gross) list. Teacher will take this into account when assessing the final reports send in. There is a list of assessment criteria available, focusing on content but also structure, source annotation, use of language, etc. Furthermore we have (good and bad) worked out examples of reports available for comparison
	Q31: Is summative assessment included and are its results used in formative assessment?

	a step-wise research (or excursion e.g.) approach. Students are free to adapt or ignore the structured stepwise way to finish the three tasks.
	Q21: What kind of cooperation is needed by students? A21: In the learning process there will be no obliged contact between students, it is an individual trajectory. The input of self-defined new sources as an update to the case knowledge base by students is encouraged. **Note:** *this will have to be different for skills labs cases where cooperation is an explicit competence defined in the project plan*
	Q22: Do students have different case characters? A22: We do not know yet in which 'real life' setting (an excursion, a research assignment or a consultancy advice) the case will take place, but all students will have the same role.
	Q23: Do students have active roles? A23: Students need to take several decisions and need to perform various activities in order to be able to finish a task successfully. This makes them a rather active participant instead of an inactive spectator.
	Q24: Do teachers have active roles? A24: No, the tutor does not have any active role in the case (in exploitation). The tutor assesses the results of the three tasks and provides feedback when needed (the feedback interaction is limited to solving strictly urgent problems). Furthermore we have (good and bad) worked out examples of assignment results available for comparison.
	Q25: What aspects induce and sustain interest and motivation? A25: This depends on the case setting. We do not know yet in which 'real life' setting (an excursion, a research assignment or a consultancy advice) the case will take place.
	Q26: What unforeseen circumstances are incorporated? A26: There will be no unforeseen circumstances build in the case environment. The multi-media sources sources might differ over time: it can for instance be that parameters used in a prior report now seem to have become outdated, political change, new report, et cetera. Because of the natural science nature of most sources this might be a problem of minor relevance. It is important to define a setting in which the political discourse has already finished.
	Q27: Is competition incorporated? How do students get rewarded for excellent performance or behaviour? A27: No, they will not be rewarded or punished for their ranking. The results of the three tasks are a part of the exam of the accompanying distance course.
Students' progress	Q28: How do students discover not yet having acquired the main complex cognitive skill? A28: The steps-list provides an overview of actions to be taken to answer the leading question, including an estimation of time for each task. So, time wise they can monitor the amount of study time passed and ahead. Before they start a task in the case, the student has completed a similar task in the accompanying course (off course on a different subject), with written stepwise guidance and accompanied by (good and bad) worked out examples for comparison.
	Q29: How can students monitor their progress? A29: The three tasks will be assessed by the tutor according to a protocol. The tasks will have fixed times. There is a list of assessment criteria available, focusing on content but also structure, source annotation, use of language, etc. Furthermore we have (good and bad) worked out examples of reports available for comparison.

Schelde

(casus 1)



Case framework

First step Design, uses case idea (analysis)

Role: Collection of standard phrases with tools/sources chronologically

Input for ingredients scenario (step 2 Design)

waarin de begeleider de student een paper over de Waddenzee stuurt dat afkomstig is van een medewerker van zijn oud-collega, zij willen graag weten wat wij hiervan vinden, kun jij dit eens bekijken en mij je commentaar sturen

waarin de student zijn commentaar op het externe paper naar de begeleider stuurt, en dit opbergt in zijn stage dossier

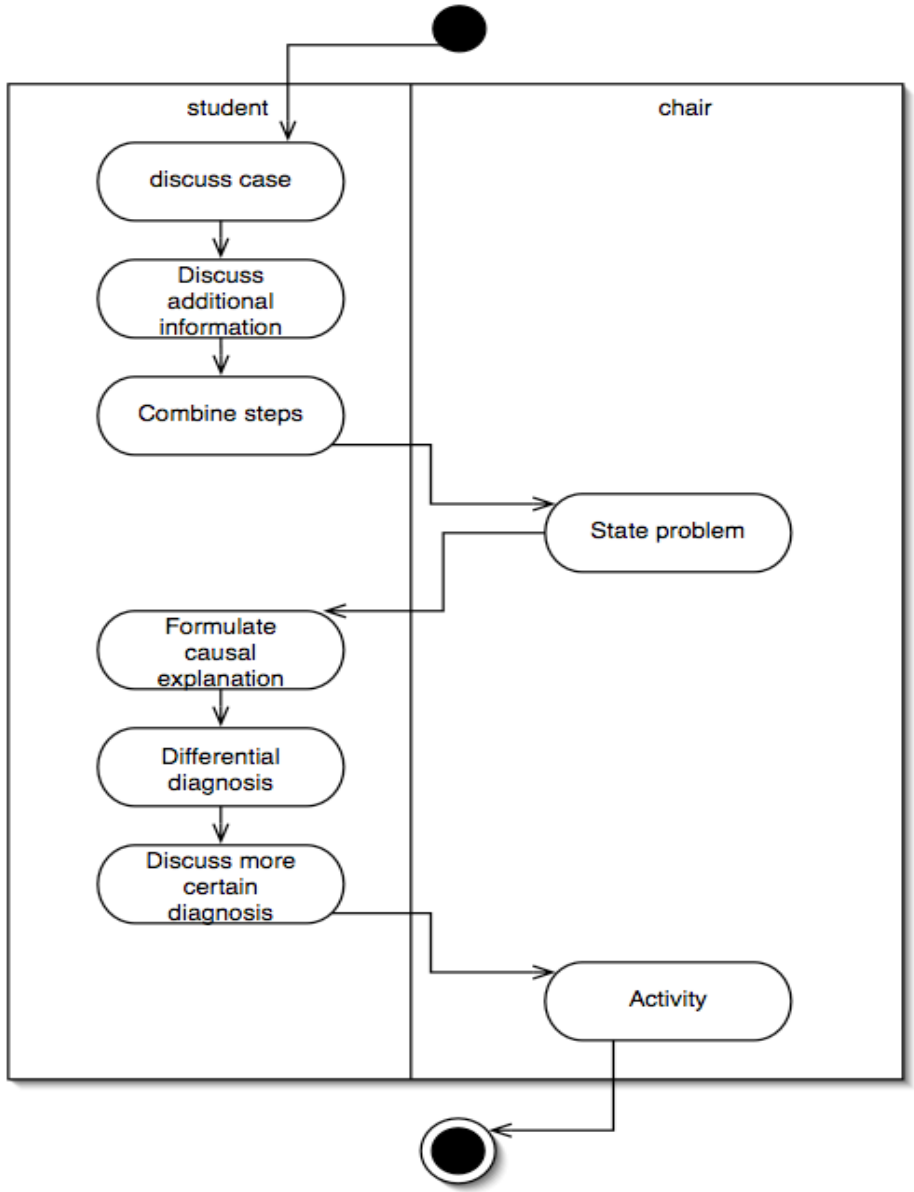
waarin de begeleider reageert op het ontvangen commentaar

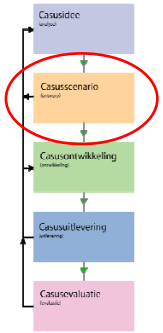
waarin de begeleider de student vraagt, nu de taak is afgerond, eens terug te kijken (reflectie) op de manier waarop de taak is uitgevoerd

waarin de student zijn eigen handelen samenvat en naar de begeleider stuurt, en opbergt in zijn stage dossier

waarin de begeleider bevestigd dat hij het reflectie verslagje heeft ontvangen, maar nu in het buitenland zit en dit later zal bekijken

Case framework: multi-role flowchart





Ingredients scenario

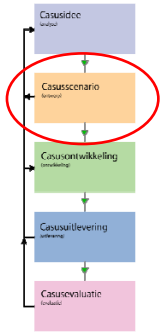
Step 2 of Design, uses framework scenario

More detailed description of tools/sources for each activity, for example: interview questions

Input for detail scenario (step 3 of Design)

waarin de begeleider de student informeert over de instelling en de medewerkers

- begeleider vertelt iets over ViBOA
- begeleider vertelt iets over de verschillende kantoorgenoten van stagiaire (*wie zijn dat allemaal?*) maar geeft aan dat de student deze zelf maar aan moeten spreken als hij meer te weten wil komen over hun rol.
- begeleider vertelt student dat naast verplichte activiteiten er een reeks facultatieve activiteiten zijn. Het uitvoeren van deze facultatieve activiteiten levert de student bonuspunten op, die op het eind verzilverd worden. (Bijvoorbeeld in de toetscasus hoeft de student met meer dan ….. bonuspunten bepaalde dingen niet te doen, die studenten met minder bonuspunten wel moeten doen).
- begeleider vertelt dat begeleiding en beoordeling niet in één hand liggen. Een docent van de onderwijsinstelling waar de student op zit, is belast met de beoordeling van de stage
- ……



Detail scenario

Step 3 of Design

Ingredients in much detail, for example complete answers to questions

Graphical representation case flow

Input for data-entry (EMERGO-toolkit) and production multimedia assets

[G: Ron ziek thuis] Waarin stagebegeleider vertelt dat Ron ziek thuis is en de begeleiding weer over neemt

[Als student bij stagebegeleider komt en in de afbeelding klikt, vertelt deze het volgende]

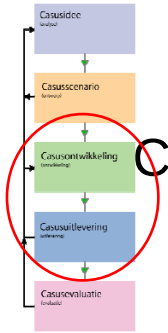
<Bestandsnaam; MSJ00112>
[Spreektekst stagebegeleider]
Ik heb vervelend nieuws voor je. Een paar dagen geleden is Ron onderuit gegaan in de badkamer en tegen het bad gevallen. Hij had zich behoorlijk bezeerd en kon niet meer lopen. In het ziekenhuis heeft men geconstateerd dat hij zijn bekken gebroken heeft. Hij heeft toen een broek van gips gekregen en nu zit hij thuis. Je begrijpt dat hij de komende weken niet op het werk kan komen. Erg vervelend voor hem.

Voor ons betekent dit ik weer de rol van begeleider op me zal nemen. Dat is op zich niet zo'n probleem, alleen ben ik natuurlijk niet zo thuis in het onderwerp als Ron. Ron heeft me gezegd dat hij wel zo goed en zo kwaad als het gaat, wil doorwerken en heeft me gevraagd of ik hem jouw uitwerking van de Waddenzee wil opsturen. Hij heeft toegezegd dat hij een reactie zal geven op je stuk. Maar ik heb geen idee wanneer hij dat doet.

[aansluitend: Als de student een gesprek heeft gehad met Van Dieren]
<Bestandsnaam; MSJ00113>
[Spreektekst stagebegeleider]
Overigens, heeft het gesprek met Wouter van Dieren nog nieuwe inzichten opgeleverd? Of anders gezegd, zou – als je dit gesprek eerder gevoerd had – dat gevolgen gehad hebben voor het stuk dat nu bij Ron ligt? Als dat zo is, zou je kunnen overwegen om hem dit te mailen zodat hij daar nog kennis van kan nemen. Dat hoeft niet hoor, maar het mag natuurlijk wel.

[aansluitend: Als student **geen** gesprek heeft gehad met Van Dieren]
<Bestandsnaam; MSJ00114>
[Spreektekst stagebegeleider]
Overigens, ik vind het wel jammer dat je niet van de gelegenheid gebruik gemaakt hebt om met Wouter van Dieren te praten. Die had je als direct betrokkene heel interessante dingen kunnen vertellen. Ik vind echt dat je hiermee een kans gemist hebt. Maar goed, het is nu eenmaal niet meer terug te draaien.....

Voor wat betreft de Waddenzee- opdracht kun je op dit moment niet veel meer doen dan wachten op de reactie van Ron. Als ik jou was, zou ik dat niet doen, maar zou ik in het Taakoverzicht kijken wat nog meer gedaan moet worden.

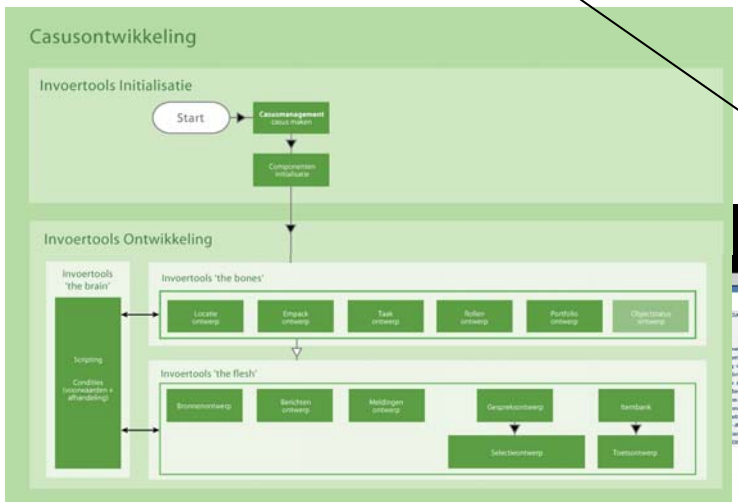


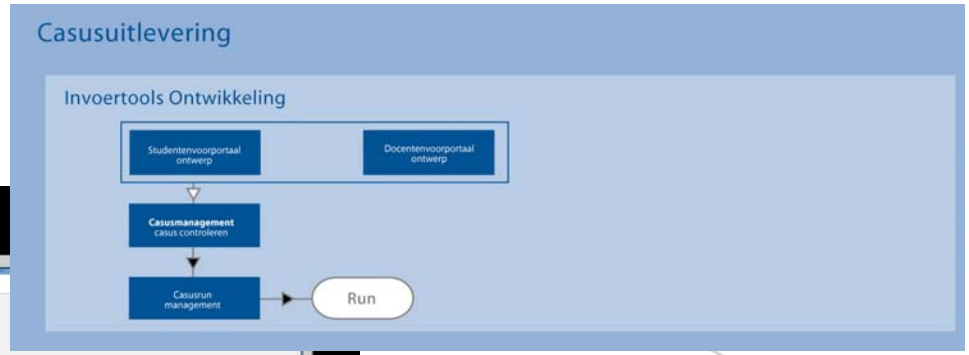
EMERGO toolkit

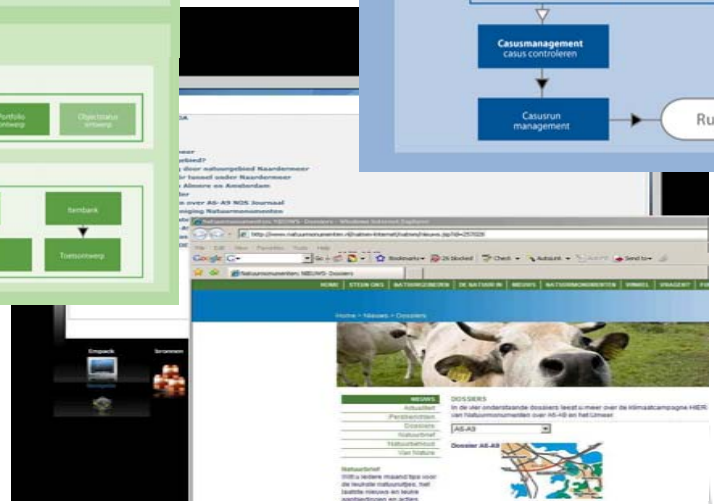
Components for data entry detailed scenario (development)

Player for testing (development) and delivery

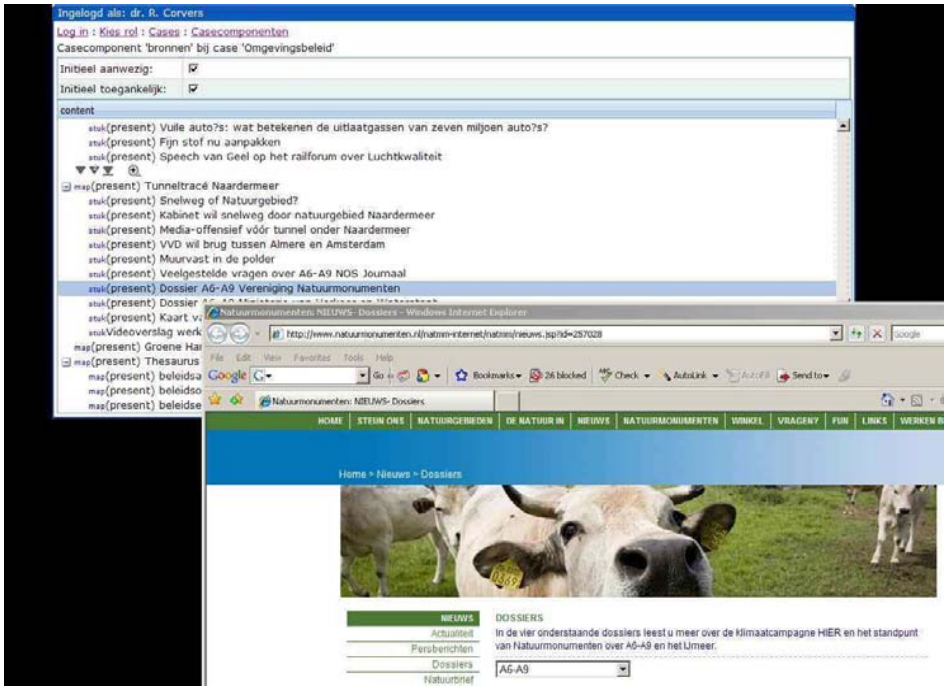
Components for case delivery (delivery)



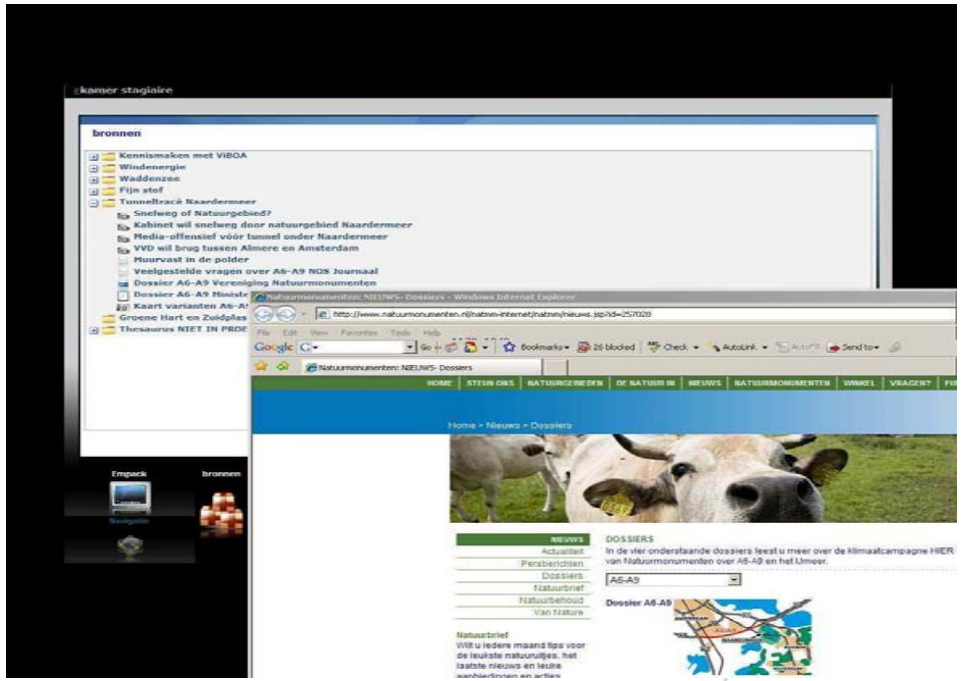




EMERGO: data entry



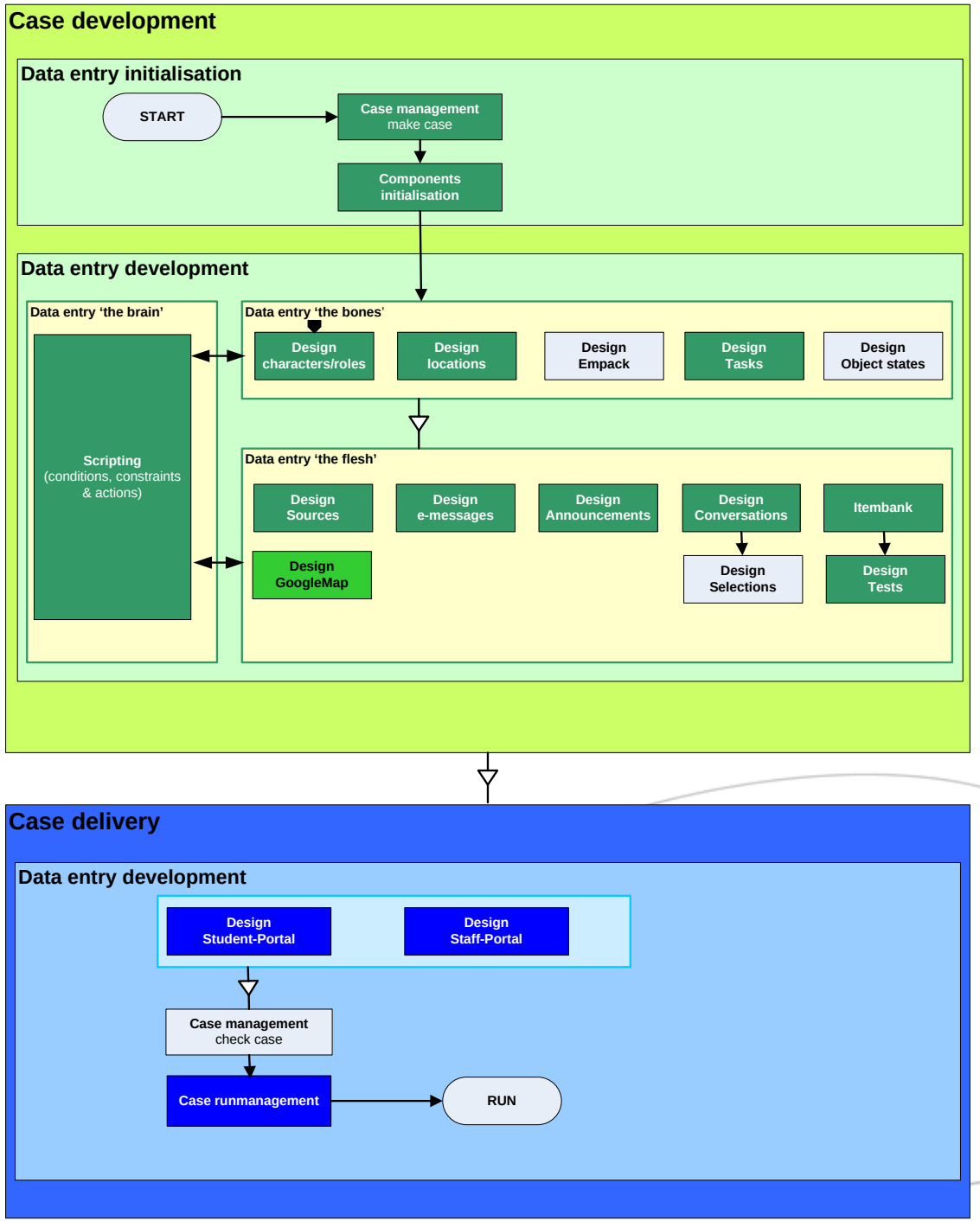
EMERGO: player



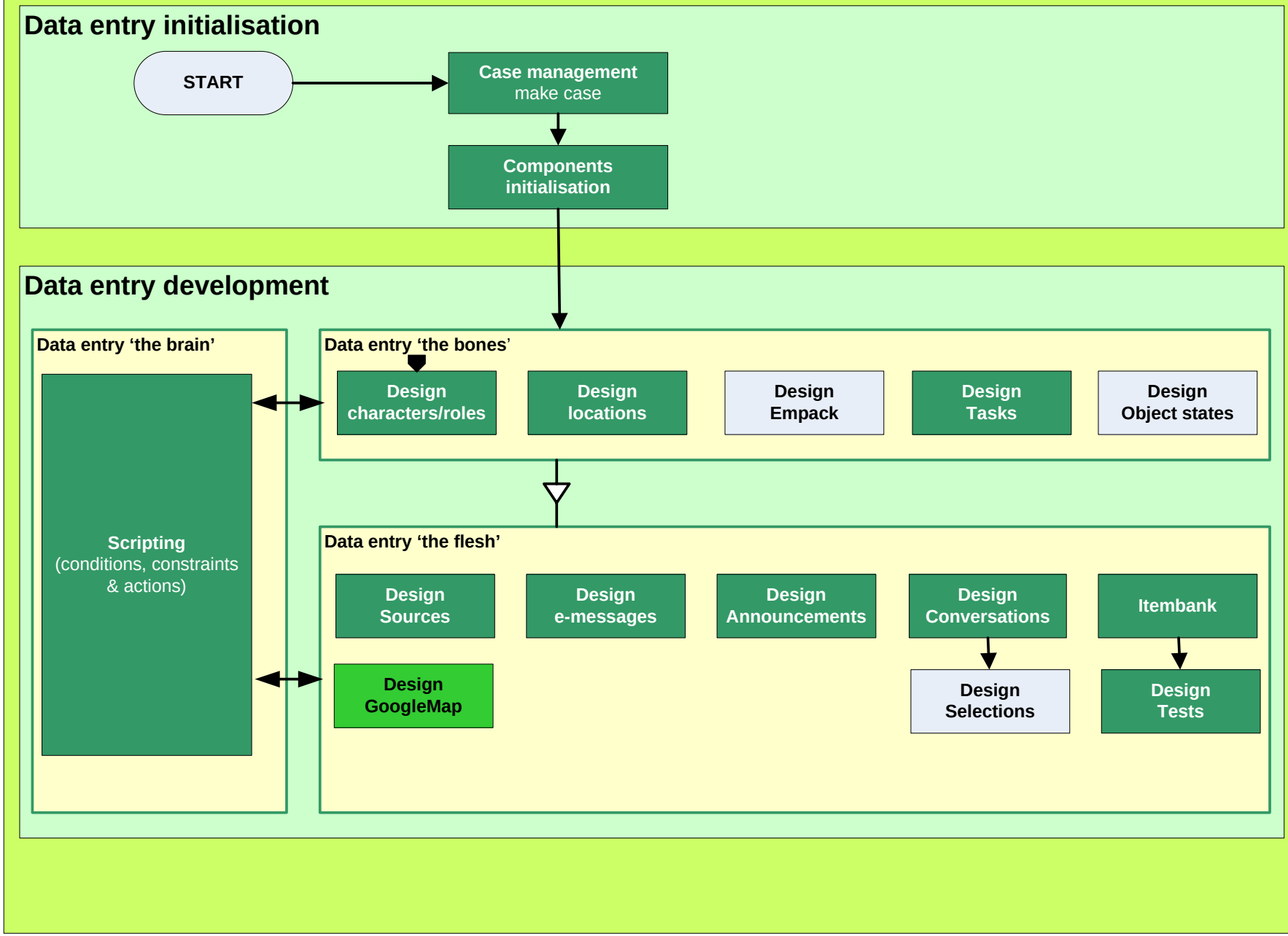
Characteristics EMERGO toolkit

- Web based production and distribution
- Data entry and player
- Individual and easy to use by authors-teachers
- Preview option on content + testing
- Scripting: customised learning environment, progress based
- Scripting: learner support, unexpected events
- Multiple characters (case roles)
- Monitoring learners' progress (self, by teachers)
- Supports Windows Media and Flash video
- Components' functionality mainly addresses case-flow(e.g. e-messages)
- Extendible with components [**not** for Skills Labs, but……]

(e.g.: multi-role, GoogleMaps [both in Skills Labs], Mobile & GPS [R&D])

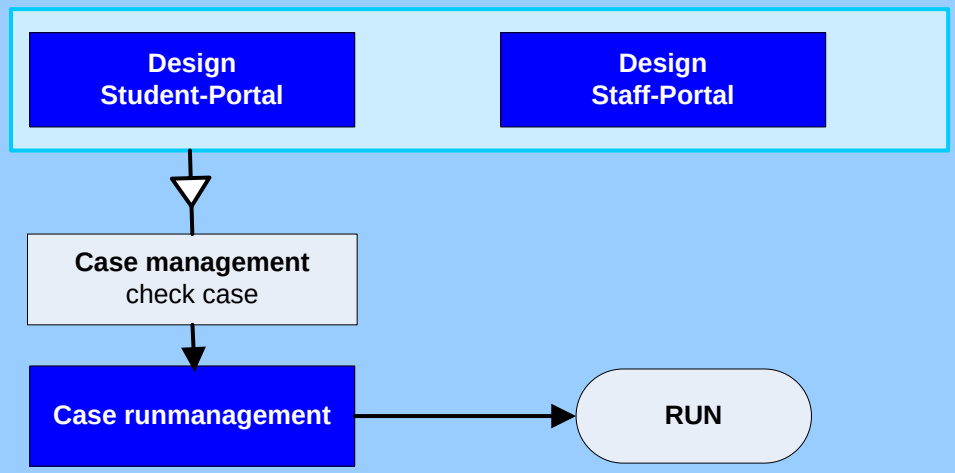

Case development
Data entry initialisation
START
Case management
make case
Components
initialisation
Data entry development
Data entry 'the brain'
Scripting
(conditions, constraints
& actions)
Data entry 'the bones'
Design
characters/roles
Design
locations
Design
Empack
Design
Tasks
Design
Object states
Data entry 'the flesh'
Design
Sources
Design
e-messages
Design
Announcements
Design
Conversations
Itembank
Design
GoogleMap
Design
Selections
Design
Tests
Case delivery
Data entry development
Design
Student-Portal
Design
Staff-Portal
Case management
check case
Case runmanagement
RUN

Case development



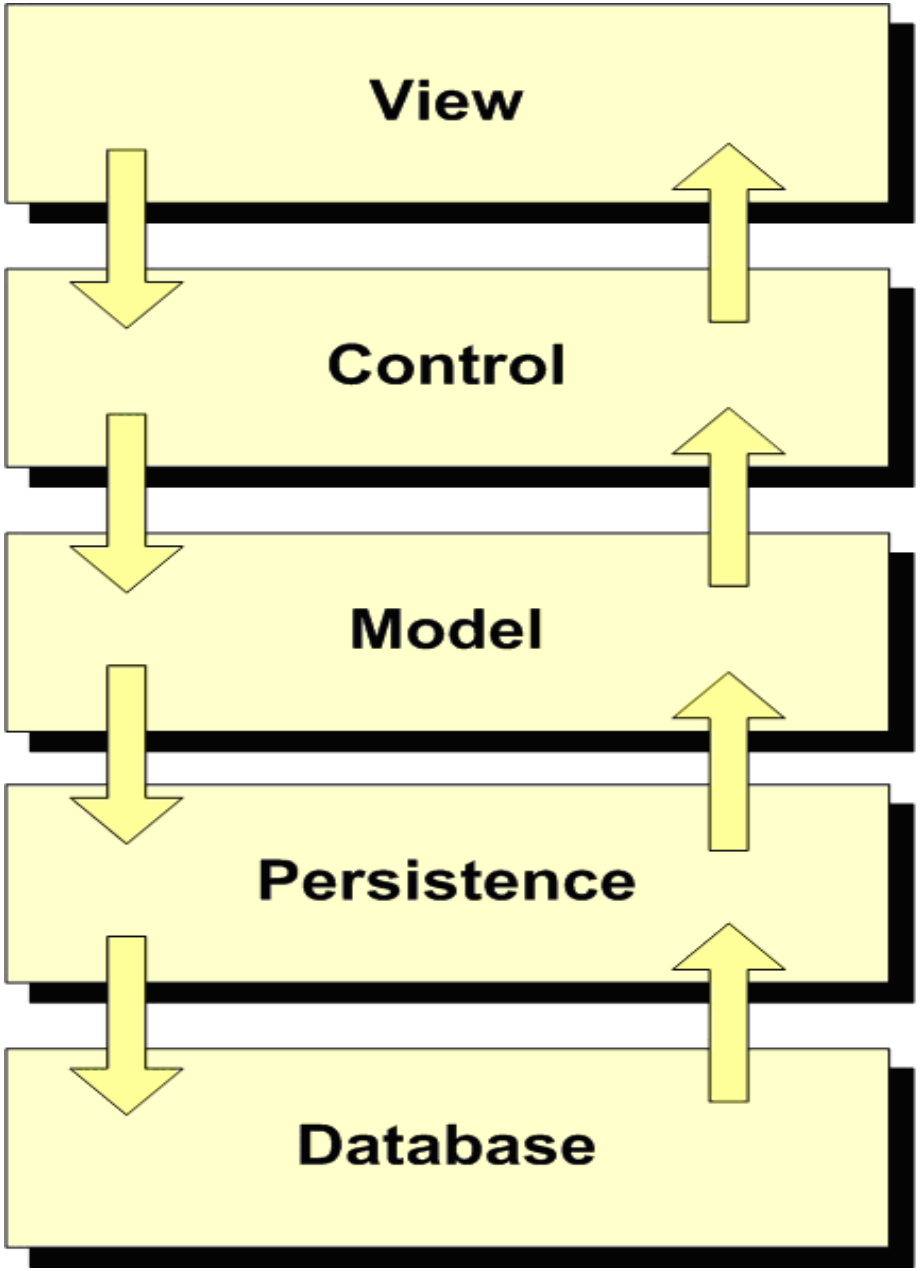
Case delivery

Data entry development



Used server system (EMERGO project environment)

- (ICTS VMWare) Windows Server 2003
- 3 GHz processor
- 2 GB internal memory (10 MB / user session)
- Java Runtime Environment 6
- Apache Tomcat 6
- MySql 5 + MySqlAdmin
- In future?: seperate database server
- In future?: seperate streaming server



Jsp en
Spring MVC +
ZK Framework

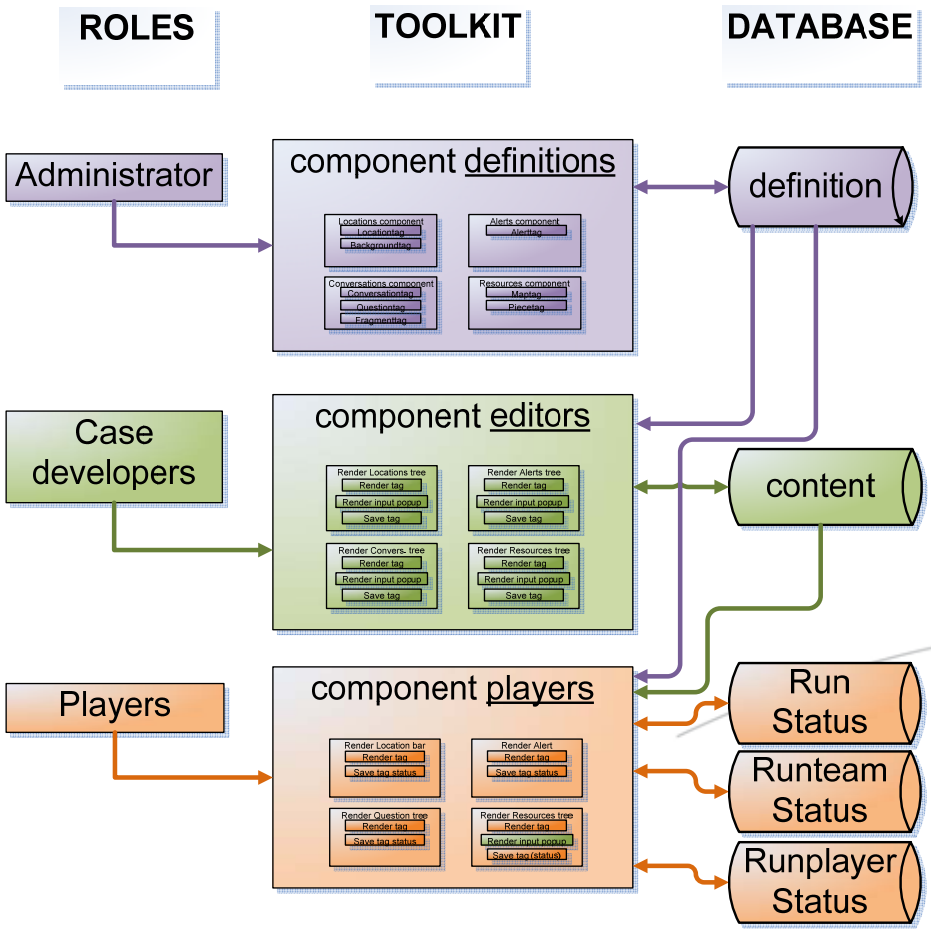
Beans
mbv Spring MVC

Java classes
mbv Spring

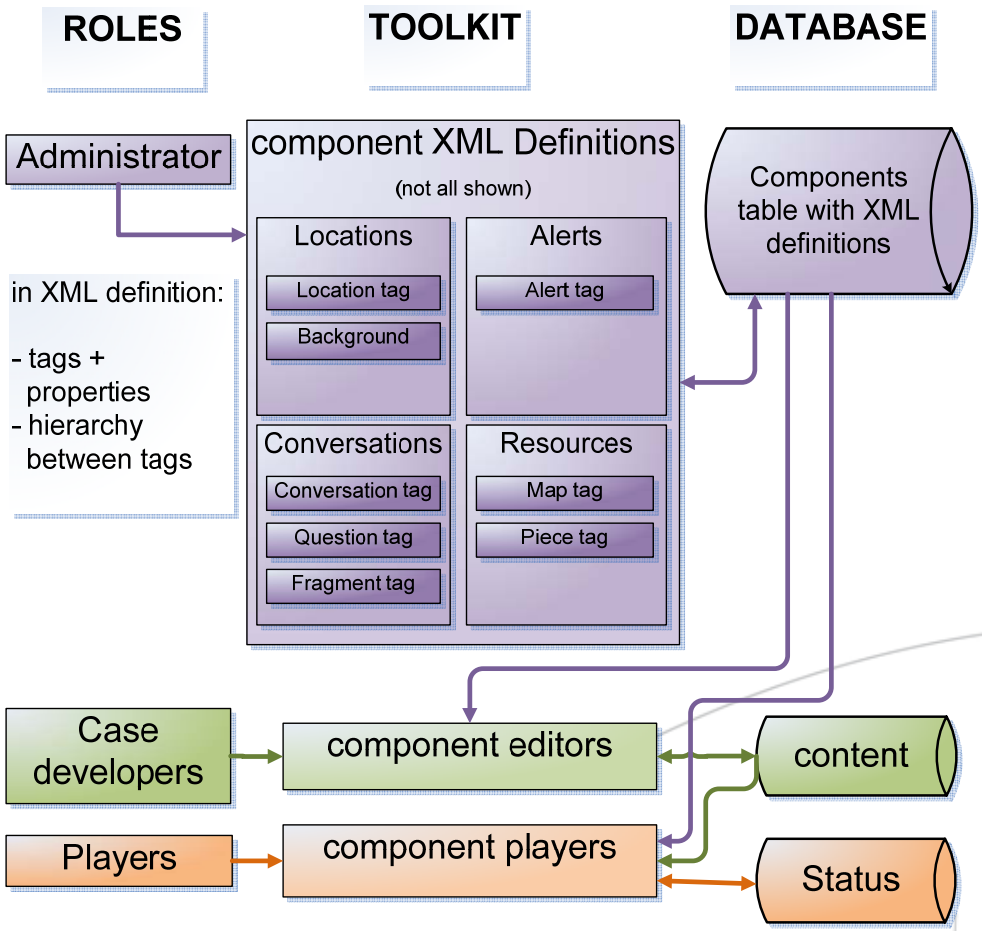
ORM
mbv Hibernate

MySQL

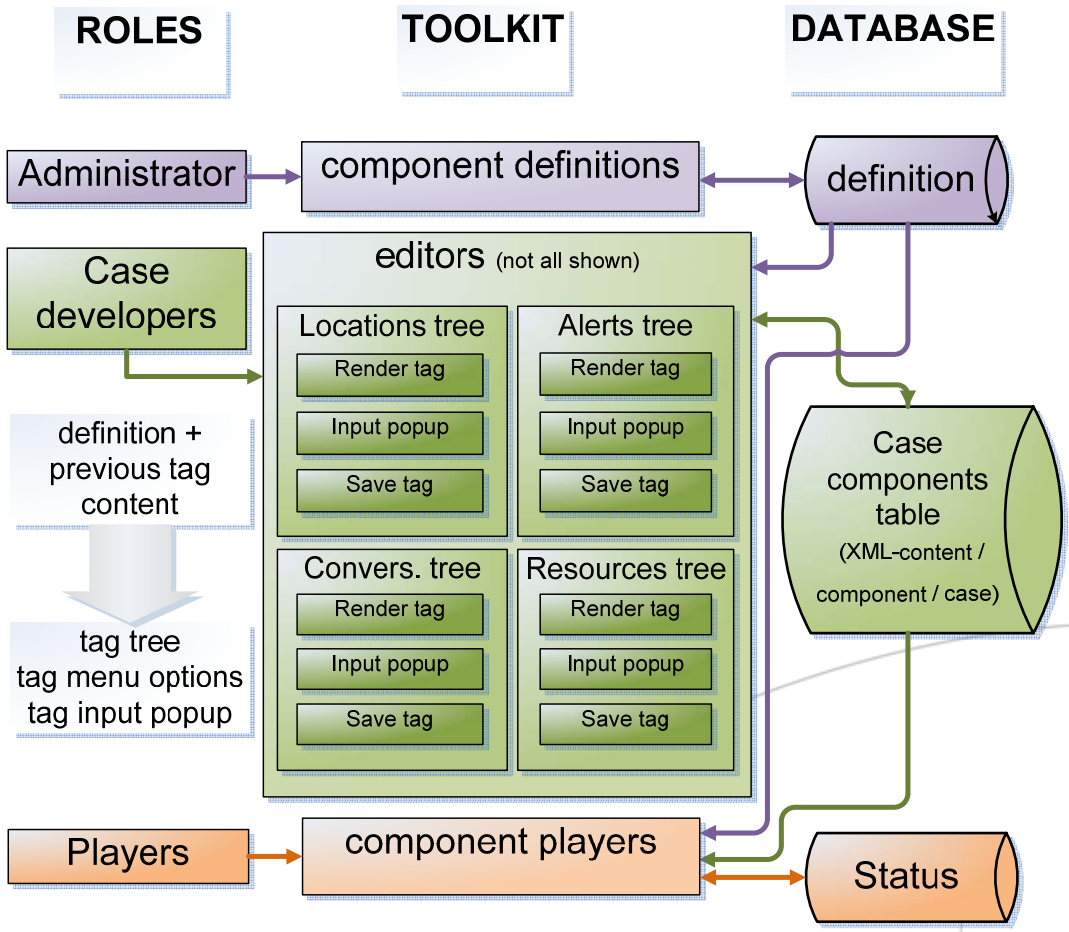
Architecture toolkit components overview



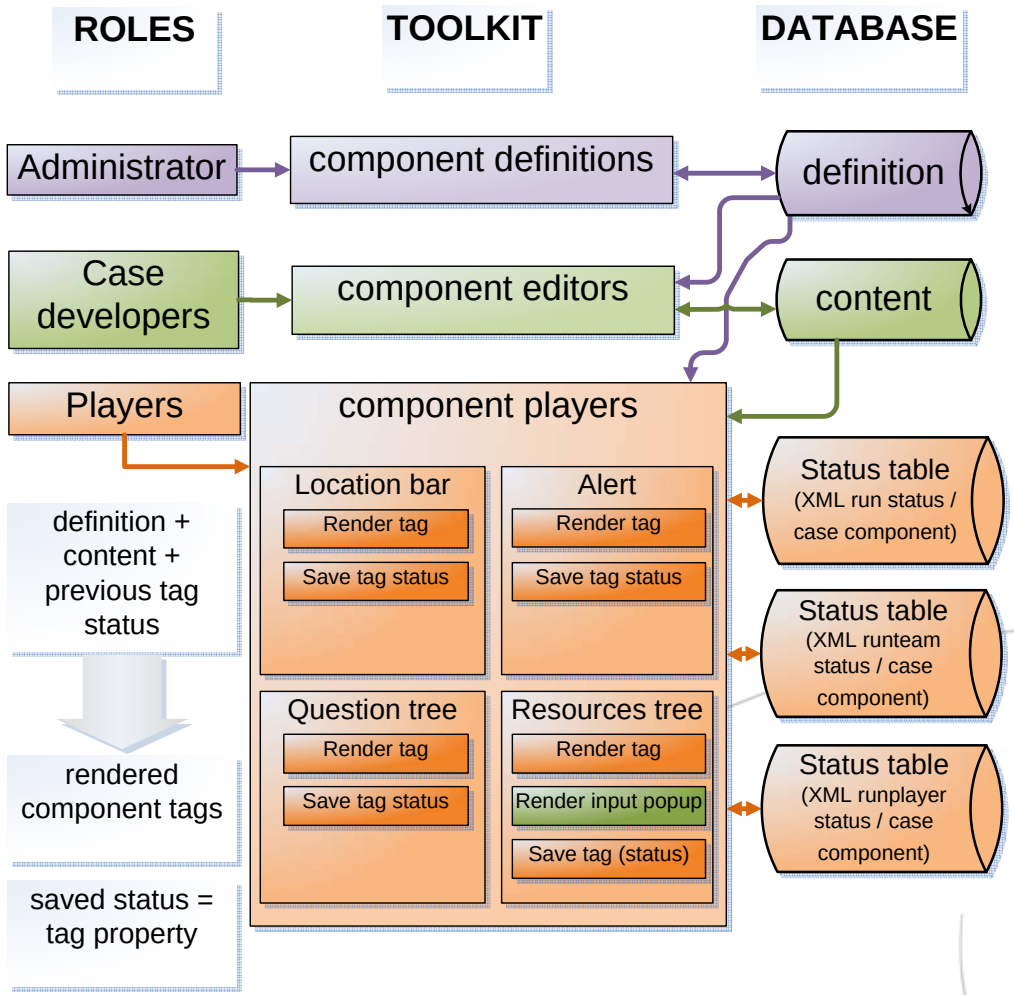
Architecture toolkit define components



Architecture toolkit edit components



Architecture toolkit play components



Examples demonstrators/templates

Limburg canon (template negotiation)

- multi-user
- prosuming
- score (competition)

CSI Heerlen (template logic reasoning and truth detection)

- single-user
- unexpected events
- time constraints
- score (compared to other players)

Data-entry for CSI Heerlen

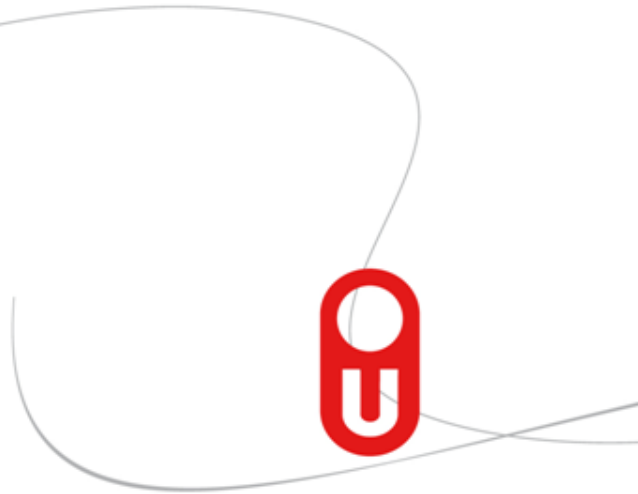
CSI Heerlen (template logic reasoning and truth detection)

- single-user
- unexpected events
- time constraints
- score (compared to other players)

Conversations component

Scripting component

- Predicate: condition + action(s)
- Condition types
- ……



Discussion - ?questions?

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- embedding EMERGO in basic infrastructure LMP
- limited Web 2.0 options
- specific adaptiveness (irt learner progress)
- mainly top-down development (design)
- still complex and time consuming (compared to ‘conventional’)
  [(content) delopment requires skilled interdisciplinary team]

- no mobile learning scenario’s……. (substitute field trip)
- not fully crystallized curriculum
- practical constraints (student collaboration in OUNL-context)

Thank you for your attention …

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